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1 [Monitoring overhead in distributed systems: visualization and estimation techniques](#)

Hasina Abdu, Hanan Lutfiyya, Michael A. Bauer

 November 1996 **Proceedings of the 1996 conference of the Centre for Advanced Studies on Collaborative research**

 Full text available: [pdf\(1.71 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Monitoring distributed systems involves the collection, analysis, and display of interactions among managed objects. These functions are carried out by the components of a *monitoring system*, such as *management agents*. During monitoring, resources in the system are shared between the monitoring system components and the monitored distributed system. Thus, the monitored system has to maintain its functionality with fewer resources. This eventually affects the performance of the monito ...

2 [Monitoring and performance measuring distributed systems during operation](#)

D. Wybraniec, D. Haban

 May 1988 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 1988 ACM SIGMETRICS conference on Measurement and modeling of computer systems**, Volume 16 Issue 1

 Full text available: [pdf\(1.22 MB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This paper describes an integrated tool for monitoring distributed systems continuously during operation. A hybrid monitoring approach is used. As special hardware support a test and measurement processor (TMP) was designed, which is part of each node in an experimental multicomputer system. Each TMP runs local parts of the monitoring software for its node, while all the TMPs are connected to a central test station via a separate TMP interconnection network. The monitoring system is transpa ...

3 [Monitoring distributed systems](#)

Jeffrey Joyce, Greg Lomow, Konrad Slind, Brian Unger

 March 1987 **ACM Transactions on Computer Systems (TOCS)**, Volume 5 Issue 2

 Full text available: [pdf\(2.37 MB\)](#)


 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

The monitoring of distributed systems involves the collection, interpretation, and display of information concerning the interactions among concurrently executing processes. This information and its display can support the debugging, testing, performance evaluation, and dynamic documentation of distributed systems. General problems associated with monitoring are outlined in this paper, and the architecture of a general purpose, extensible,

distributed monitoring system is presented. Three a ...

4 Object lessons learned from a distributed system for remote building monitoring and operation

Frank Olken, Hans-Arno Jacobsen, Chuck McParland, Mary Ann Piette, Mary F. Anderson
October 1998 **ACM SIGPLAN Notices , Proceedings of the 13th ACM SIGPLAN conference on Object-oriented programming, systems, languages, and applications**, Volume 33 Issue 10


Full text available:  pdf(1.54 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper we describe our experiences with the design, the deployment, and the initial operation of a distributed system for the remote monitoring and operation of multiple heterogeneous commercial buildings across the Internet from a single control center. Such systems can significantly reduce building energy usage. Our system is distinguished by its ability to interface to multiple heterogeneous legacy building Energy Management Control Systems (EMCSs), its use of the Common Object Request ...

5 A probe-based monitoring scheme for an object-oriented distributed operating system


Partha Dasgupta
June 1986 **ACM SIGPLAN Notices , Conference proceedings on Object-oriented programming systems, languages and applications**, Volume 21 Issue 11

Full text available:  pdf(762.64 KB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

6 Core algorithms for autonomous monitoring of distributed systems

Victor Jon Griswold
December 1991 **ACM SIGPLAN Notices , Proceedings of the 1991 ACM/ONR workshop on Parallel and distributed debugging**, Volume 26 Issue 12

Full text available:  pdf(1.02 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

7 Astrolabe: A robust and scalable technology for distributed system monitoring, management, and data mining

Robbert Van Renesse, Kenneth P. Birman, Werner Vogels
May 2003 **ACM Transactions on Computer Systems (TOCS)**, Volume 21 Issue 2

Full text available:  pdf(341.62 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Scalable management and self-organizational capabilities are emerging as central requirements for a generation of large-scale, highly dynamic, distributed applications. We have developed an entirely new distributed information management system called Astrolabe. Astrolabe collects large-scale system state, permitting rapid updates and providing on-the-fly attribute aggregation. This latter capability permits an application to locate a resource, and also offers a scalable way to track sys ...

Keywords: Aggregation, epidemic protocols, failure detection, gossip, membership, publish-subscribe, scalability

8 A real-time monitor for a distributed real-time operating system

Hideyuki Tokuda, Makoto Kotera, Clifford E. Mercer
November 1988 **ACM SIGPLAN Notices , Proceedings of the 1988 ACM SIGPLAN and SIGOPS workshop on Parallel and distributed debugging**, Volume 24 Issue 1


Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index](#)

Full text available:  [pdf\(967.71 KB\)](#)[terms](#), [review](#)

Monitoring and debugging for a distributed real-time system is a complicated problem due to the lack of a set of advanced tools and adequate operating system capability. Software tools can cover the wide range of the software development life cycle from the requirement analysis phase to debugging and maintenance phases. However, many of these modern tools are not effective for building or analyzing complex real-time systems. Real-time software tools and effective kernel support are essential ...

9 Mobile agents for monitoring distributed systems


Delbert Hart, Mihail Tudoreanu, Eileen Kraemer

May 2001 **Proceedings of the fifth international conference on Autonomous agents**Full text available:  [pdf\(95.90 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Mobile agents can be employed to help a system adapt to diverse conditions and provide functionality that would otherwise be cumbersome and perhaps in-feasible. The benefits of mobile agents though are not without their own costs in performance and complexity. This paper gives an overview of our work in determining when mobile agents are appropriate for monitoring distributed applications. The high degree of variability resulting from the interaction between the users, applications, and the ...

10 ChaosMON—application-specific monitoring and display of performance information for parallel and distributed systems

Carol Kilpatrick, Karsten Schwan

December 1991 **ACM SIGPLAN Notices , Proceedings of the 1991 ACM/ONR workshop on Parallel and distributed debugging**, Volume 26 Issue 12Full text available:  [pdf\(1.08 MB\)](#)Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

11 Monitoring and state transparency of distributed systems

Martin J. Logan


September 2004 **Proceedings of the 2004 ACM SIGPLAN workshop on Erlang**Full text available:  [pdf\(200.74 KB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents the **System Status** suite of applications. These applications are used to provide a simple, uniform, and low developer cost system for exporting and tracking the state of OTP applications and services over a distributed server farm network architecture. The terms, simple, and low developer cost, will be elaborated on later in the paper. The system is intended to provide no formalized management framework it is specifically a state/status export and monitoring infrastruc ...

Keywords: concurrent programming, distributed computing, monitoring, server farm, services oriented network

12 A relational approach to monitoring complex systems

Richard Snodgrass

May 1988 **ACM Transactions on Computer Systems (TOCS)**, Volume 6 Issue 2Full text available:  [pdf\(3.42 MB\)](#)Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Monitoring is an essential part of many program development tools, and plays a central role in debugging, optimization, status reporting, and reconfiguration. Traditional monitoring techniques are inadequate when monitoring complex systems such as multiprocessors or distributed systems. A new approach is described in which a historical database forms the conceptual basis for the information processed by the monitor. This approach permits

advances in specifying the low-level data collection, ...

13 A scalable SNMP-based distributed monitoring system for heterogeneous network computing

Rajesh Subramanyan, José Miguel-Alonso, José A. B. Fortes

November 2000 **Proceedings of the 2000 ACM/IEEE conference on Supercomputing (CDROM)**

Full text available:  [pdf\(171.64 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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Traditional centralized monitoring systems do not scale to present-day large, complex, network-computing systems. Based on recent SNMP standards for distributed management, this paper addresses the scalability problem through distribution of monitoring tasks, applicable for tools such as SIMONE (SNMP-based monitoring prototype implemented by the authors). Distribution is achieved by introducing one or more levels of a dual entity called the Intermediate Level Manager (ILM) bet ...

14 A performance monitoring application for distributed interactive simulations (DIS)

David B. Cavitt, C. Michael Overstreet, Kurt J. Maly

December 1997 **Proceedings of the 29th conference on Winter simulation**

Full text available:  [pdf\(922.38 KB\)](#)

Additional Information: [full citation](#), [references](#), [index terms](#)

15 Performance evaluation of software architecture: A framework for performance monitoring, modelling and prediction of component oriented distributed systems

Adrian Mos, John Murphy

July 2002 **Proceedings of the third international workshop on Software and performance**

Full text available:  [pdf\(150.21 KB\)](#)


Additional Information: [full citation](#), [abstract](#), [references](#)

We present a framework that can be used to identify performance issues in component-oriented distributed systems. The framework consists of a monitoring module, a modelling module and a prediction module, that are interrelated. The monitoring block extracts real-time performance data from a live or under development system. The modelling block generates UML models of the system showing where the performance problems are located and drives the monitoring process. The performance prediction block ...

16 Debugging heterogeneous distributed systems using event-based models of behavior

Peter C. Bates

February 1995 **ACM Transactions on Computer Systems (TOCS)**, Volume 13 Issue 1

Full text available:  [pdf\(2.15 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

We describe a high-level debugging approach, Event-Based Behavioral Abstraction (EBBA), in which debugging is treated as a process of creating models of expected program behaviors and comparing these to the actual behaviors exhibited by the program. The use of EBBA techniques can enhance debugging-tool transparency, reduce latency and uncertainty for fundamental debugging activities, and accommodate diverse, heterogeneous architectures. Using events and behavior models as a basic mechanism ...

Keywords: behavior modeling, debugging, events

17

Software architecture: An integrated distributed systems management architecture

Michael A. Bauer, Pat J. Finnigan, James W. Hong, Jan K. Pachl, Toby J. Teorey
 October 1993 **Proceedings of the 1993 conference of the Centre for Advanced Studies
 on Collaborative research: software engineering - Volume 1**

Full text available:  pdf(1.08 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

As distributed systems get larger and more complex, there is an urgent need to manage their components in order to ensure reliable and efficient operations. Managing distributed systems entails monitoring the activities of their components and controlling their behavior as needed. This paper examines the requirements of managing distributed systems and proposes an integrated management architecture. The proposed architecture can provide the support for the management of not only the network serv ...

18 Integrating visualization into event monitoring and analysis in distributed systems management


Stephen L. Howard, James W. Hong, Michael J. Katchabaw, Michael A. Bauer
 November 1995 **Proceedings of the 1995 conference of the Centre for Advanced Studies
 on Collaborative research**

Full text available:  pdf(333.09 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Effective management of distributed computing systems involves monitoring, analysis and control of hosts, networks, and applications. The complexity of these systems calls for innovative tools to enhance the ability of human managers to comprehend the activity within the system in order to facilitate better management. In our research, we explore techniques for visualizing the effects of management activity on a distributed computing environment. Using the visualization tools of the Partial Order ...

19 Monitoring data streams: Adaptive filters for continuous queries over distributed data streams

Chris Olston, Jing Jiang, Jennifer Widom
 June 2003 **Proceedings of the 2003 ACM SIGMOD international conference on
 Management of data**

Full text available:  pdf(244.11 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We consider an environment where distributed data sources continuously stream updates to a centralized processor that monitors continuous queries over the distributed data. Significant communication overhead is incurred in the presence of rapid update streams, and we propose a new technique for reducing the overhead. Users register continuous queries with precision requirements at the central stream processor, which installs filters at remote data sources. The filters adapt to changing condition ...

20 A scalable distributed information management system

Praveen Yalagandula, Mike Dahlin
 August 2004 **ACM SIGCOMM Computer Communication Review , Proceedings of the
 2004 conference on Applications, technologies, architectures, and
 protocols for computer communications, Volume 34 Issue 4**

Full text available:  pdf(364.00 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a Scalable Distributed Information Management System (SDIMS) that *aggregates* information about large-scale networked systems and that can serve as a basic building block for a broad range of large-scale distributed applications by providing detailed views of nearby information and summary views of global information. To serve as a basic building block, a SDIMS should have four properties: scalability to many nodes and attributes, flexibility to accommodate a broad range of appl ...

Keywords: distributed hash tables, information management system, networked system monitoring

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